

A Paradigm Shift in Hemodynamics: Re-evaluating the Role of Vascular Compliance in Sepsis Management

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Abstract. Sepsis remains a leading cause of morbidity and mortality worldwide, necessitating an innovative perspective on its management. This study challenges traditional hemodynamic parameters, proposing that vascular compliance significantly influences outcomes in septic patients. Utilizing a retrospective cohort study involving 500 patients admitted with sepsis, we employed advanced echocardiographic techniques and invasive hemodynamic monitoring. Our results demonstrate that integrating vascular compliance metrics into clinical practice could enhance fluid resuscitation strategies, leading to improved patient prognoses. This article advocates for a transformational shift in hemodynamic assessment protocols within sepsis care, emphasizing the need for further research on vascular dynamics.

Keywords: sepsis management, hemodynamic monitoring, vascular compliance, critical illness, fluid resuscitation, patient outcomes, echocardiography, cardiovascular dynamics

Introduction

Sepsis is a complex syndrome arising from a dysregulated host response to infection, characterized by systemic inflammation and organ dysfunction. It is recognized as a leading cause of critical illness, contributing significantly to health care costs and mortality rates globally. With projections indicating an increasing prevalence due to rising antibiotic

resistance and an aging population, the urgency to develop more effective management strategies has never been more critical. Current hemodynamic monitoring techniques focus primarily on cardiac output and systemic vascular resistance, often overlooking the importance of vascular compliance—a key determinant of blood flow and organ perfusion. This oversight may contribute to suboptimal fluid resuscitation and patient outcomes. This paper embarks on a critical re-evaluation of established hemodynamic monitoring practices, advocating for a more inclusive approach that integrates assessments of vascular compliance. We will first explore the pathophysiology of sepsis and its implications for hemodynamic stability. Next, we will present a retrospective analysis of sepsis patients, juxtaposing traditional parameters with vascular compliance metrics. Following this, we will discuss the potential for these insights to inform clinical practice and enhance patient care. Finally, we will conclude by addressing the broader implications for future research and clinical guidelines.

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References

1. Шаповалова, В. В., Шармазанова, Е. П., Бортный, Н. А., & Скорик, А. Р. (2018). Комплексная лучевая диагностика некротического энтероколита у новорожденных. *Здоровье ребенка*, 13(Приложение 1), 100-106.